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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/421,625

10/19/1999

EUGENE P. MARSH

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02/26/2003

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EXAMINER

VU, HUNG K

ART UNIT

PAPER NUMBER

2811

DATE MAILED: 02/26/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/421,625

Applicant(s)

MARSH, EUGENE P.

Examiner

Hung K. Vu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11/26/02.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 65-67, 74, 77-81, 83-85, 87, 89 and 91-96 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 65-67, 74, 77-81, 83-85, 87, 89 and 91-96 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 65-67, 74, 77, 85, 87, 89 and 92-96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Aoki et al. (PN 6,033,953, of record) in view of Kingon et al. (PN 5,555,486, of record).

Aoki et al. discloses, as shown in Figures 1B-1D, a capacitor comprising,

a substrate (1);

a roughened platinum layer (38) over the substrate, the roughened platinum layer having a continuous surface characterized by columnar pedestals;

an intervening layer (39) between the platinum layer and the substrate.

Aoki et al. discloses the intervening layer comprising titanium nitride. Note Col. 4, lines 7-9 of Aoki et al.. Aoki et al. does not disclose the intervening layer comprising at least one of IrO₂, RuO₂, RhO₂, or OsO₂. However, Kingon et al. discloses an intervening layer (22), formed under a platinum layer (23), comprising at least one of IrO₂, RuO₂, RhO₂, or OsO₂. Note Col. 5, lines 15-25 and Figure 1a of Kingon et al.. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the intervening layer of Aoki et al.'s

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comprising at least one of IrO_2 , RuO_2 , RhO_2 , or OsO_2 , such as taught by Kingon et al. in order to improve the capacitor performance both in terms of fatigue and leakage current.

Although Aoki et al. and Kingon et al. do not teach exact the thickness of the platinum layer, the height of columnar pedestals, and the average diameter of the columnar pedestals, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the platinum layer and the columnar pedestals of Aoki et al. and Kingon et al. having a desire thickness, height and average diameter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claim 66, Aoki et al. and Kingon et al. disclose wherein the pedestals terminate in dome-shaped tops. Note Figures 1B-1D of Aoki et al..

With regard to claim 67, Aoki et al. and Kingon et al. disclose wherein the pedestals terminate in hemispherical tops. Note Figures 1B-1D of Aoki et al..

With regard to claim 74, Aoki et al. and Kingon et al. disclose, as shown in Figures 1B-1D, a capacitor comprising,

- a first capacitor electrode (38) over a monocrystalline silicon substrate (1);

- a second capacitor electrode (37);

- a dielectric layer (40) between the first and second capacitor electrodes;

- wherein at least one of the first and second capacitor electrodes comprise roughened

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platinum, the roughened platinum having a continuous surface characterized by columnar pedestals having heights greater than or equal to about one-third of a total thickness of the roughened platinum. Note that Figures 1B-1D show columnar pedestals having heights greater than or equal to about one-third of a total thickness of the roughened platinum.

Although Aoki et al. and Kingon et al. do not teach exact the average diameter of the columnar pedestals, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the columnar pedestals of Aoki et al. and Kingon et al. having a desire average diameter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

With regard to claim 85, Aoki et al. and Kingon et al. disclose all of the claimed limitations except the roughened platinum layer comprises a platinum alloy comprising platinum and at least one of rhodium, ruthenium or palladium. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the roughened platinum layer comprises a platinum alloy comprising platinum and at least one of rhodium, ruthenium or palladium in order to provide thermal stability at high temperatures.

With regard to claims 92-96, the terms “formed by a process comprising: ... depositing”, the oxidizing gas ... 1 to 3”, “the platinum precursor ... platinum hexafluoroacetylacetonate”, “the maintaining a temperature ... 280C”, and flowing at least one other metal precursor ... at least one other metal” are method recitations in a device claimed. Note that only the final product is

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relevant, not the method of making. A product by process claim is directed to the product per se, no matter how actually made. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not.

2. Claims 65-67, 74, 77-81, 83-85, 87, 89, and 91-96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakamura (PN 6,232,629, of record).

Nakamura discloses, as shown in Figures 2, 3A, 7 – 10D, and 24 – 32, a capacitor comprising,
a substrate (102);

a roughened platinum layer (112) over the substrate, the roughened platinum layer having a continuous surface characterized by columnar pedestals;

an intervening layer (111) between the platinum layer and the substrate, the intervening layer comprising at least one of IrO₂, RuO₂, RhO₂, or OsO₂.

Nakamura does not teach specific thickness of the platinum layer, the height of columnar pedestals, and the average diameter of the columnar pedestals, as that claimed by Applicants, however, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the platinum layer and the columnar pedestals of Nakamura having desired thickness, height and average diameter, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

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With regard to claim 66, Nakamura discloses wherein the pedestals terminate in dome-shaped tops. Note Figures 2, 8 and 26 of Nakamura.

With regard to claims 67 and 84, Nakamura discloses wherein the pedestals terminate in hemispherical tops. Note Figures 2, 8 and 26 of Nakamura.

With regard to claim 74, Nakamura discloses, as shown in Figures 2, 8 and 26, a capacitor comprising,

- a first capacitor electrode (32) over a monocrystalline silicon substrate (102);

- a second capacitor electrode (35);

- a dielectric layer (8) between the first and second capacitor electrodes;

wherein at least one of the first and second capacitor electrodes comprises roughened platinum, the roughened platinum having a continuous surface characterized by columnar pedestals having heights greater than or equal to about one-third of a total thickness of the roughened platinum. Note that Figures 2, 8 and 26 show columnar pedestals having heights greater than or equal to about one-third of a total thickness of the roughened platinum.

With regard to claim 85, Nakamura discloses all of the claimed limitations except the roughened platinum layer comprises a platinum alloy comprising platinum and at least one of rhodium, ruthenium or palladium. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the roughened platinum layer comprises a

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platinum alloy comprising platinum and at least one of rhodium, ruthenium or palladium in order to provide thermal stability at high temperatures.

With regard to claims 92-96, the terms “formed by a process comprising: ... depositing”, the oxidizing gas ... 1 to 3”, “the platinum precursor ... platinum hexafluoroacetylacetonate”, “the maintaining a temperature ... 280C”, and flowing at least one other metal precursor ... at least one other metal” are method recitations in a device claimed. Note that only the final product is relevant, not the method of making. A product by process claim is directed to the product per se, no matter how actually made. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not.

3. Claims 92-96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Buskirk et al. (PN 6,010,744, of record).

Buskirk et al. discloses, as shown in Figure 1E, a capacitor comprising,

- a first capacitor electrode (18) over a monocrystalline silicon substrate;
- a second capacitor electrode (20a);
- a dielectric layer (19) between the first and second capacitor electrodes;
- at least one of the first and second capacitor electrodes comprising roughened platinum.

Note that the terms “formed by a process comprising: ... depositing”, the oxidizing gas ... 1 to 3”, “the platinum precursor ... platinum hexafluoroacetylacetonate”, “the maintaining a temperature ... 280C”, and flowing at least one other metal precursor ... at least one other metal”

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are method recitations in a device claimed. Note that only the final product is relevant, not the method of making. A product by process claim is directed to the product per se, no matter how actually made. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in "product by process" claims or not.

Response to Arguments

4. Applicant's arguments filed 11/26/02 have been fully considered but they are not persuasive.

It is argued, at pages 5-7 of the Remarks, that the purpose of Aoki is to reduce the roughness of the platinum layer 38 by to "flatten" platinum layer that Aoki teaches against enhancing or even maintaining the roughness of a platinum layer. This argument is not convincing because Aoki et al. teaches, at Col. 5, lines 44-59, that the electropolishing condition can be set to form a spherical curved surface.

It is argued, at pages 5-7 of the Remarks, that Aoki et al. and Kingon et al. do not disclose the columnar pedestals having an average diameter of at least about 200 Angstroms and that it is not an optimum value the discovery of which involves only routine skill in the art. This argument is not convincing because Aoki et al. teaches, at Col. 6, lines 13-21, that the grain size of platinum particles on the surface of the platinum layer is 200 Angstroms. Therefore, one skill in the art would be motivated to form the columnar pedestals having an average diameter that are the same as the grain size of the platinum particles.

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It is argued, at page 8 of the Remarks, that Buskirk does not disclose the method recitations of claim 92 for forming the roughened platinum. This argument is not convincing because it is product by process claim. Further, Buskirk discloses, at Col. 4, line 58 – Col. 5, line 18, the formation of the roughened platinum.

It is argued, at pages 9-10 of the Remarks, that Nakamura does not disclose the roughened platinum and that columnar pedestals having an average diameter of at least about 200 Angstroms is not an optimum value the discovery of which involves only routine skill in the art. This argument is not convincing because Nakamura discloses, as shown in Figures 2, 8 and 26, the platinum layer having a roughened surface. Aoki et al. is cited to support that the grain size of 200 Angstroms is an optimum value.

It is argued that none of the references discloses the limitations of the product-by-process claim 92. This argument is not convincing because a product by process claim is directed to the product per se, no matter how actually made. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claimed in “product by process” claims or not.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hung K. Vu whose telephone number is (703) 308-4079. The examiner can normally be reached on Mon-Thurs 7:00-4:30 and every other Friday 7:00-3:30, Eastern Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Vu

February 20, 2003


TOM THOMAS
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER, AUCO